

Claims

- [1] A display apparatus including a display device for displaying an image or a picture and a viewing angle controlling unit arranged over said display device, said viewing angle controlling unit comprising:
a pair of substrates, each comprising at least an electrode and an alignment film, facing each other such that said alignment films are opposite to each other;
a liquid crystal layer sandwiched between said pair of substrates; and
a pair of polarized plates arranged outside said pair of substrates sandwiching said liquid crystal layer;
wherein rubbing directions of the respective alignment films of said pair of substrates are substantially parallel to each other.
- [2] A display apparatus as claimed in claim 1, wherein said pair of polarized plates are arranged in crossed Nicols way.
- [3] A display apparatus as claimed in claim 2, wherein an optical axis of one polarized plate is substantially perpendicular to said rubbing direction and an optical axis of an other polarized plate is in substantially parallel to said rubbing direction.
- [4] A display apparatus as claimed in claim 1, wherein said pair of polarized plates are arranged in parallel Nicols way.
- [5] A display apparatus as claimed in claim 4, wherein optical axes of said pair of polarized plates are in substantially parallel to said rubbing direction.
- [6] A display apparatus as claimed in any one of claims 1 to 5, further comprising a power source for applying a voltage to said electrode and power source controlling means for controlling the switching of said power source.
- [7] A display apparatus as claimed in any one of claims 1 to 6, wherein a retardation value of said liquid crystal layer is within the range of 200nm to 1000nm.
- [8] A display apparatus as claimed in any one of claims 1 to 7, wherein said optical axis is an absorption axis or a transparent axis.
- [9] A display apparatus as claimed in any one of claims 1 to 8, wherein said display device is a light-receiving type of display device or a light-emitting type of display device.
- [10] A display apparatus as claimed in claim 9, wherein in the case that said display device is the light-emitting type of display device, said viewing angle controlling unit is arranged on a display screen of said display

device.

- [11] A display device as claimed in claim 9 or 10, wherein said display device is a device selected from a group consisting of a liquid crystal display device, an electro-luminescence display device, a plasma display device and a cathode ray tube.
- [12] A viewing angle controlling unit comprising:
a pair of substrates, each having at least an electrode and an alignment film, facing each other such that said alignment films are opposite to each other;
a liquid crystal layer sandwiched between said pair of substrates; and
a pair of polarized plates arranged outside said pair of substrates sandwiching said liquid crystal layer;
wherein rubbing directions of the respective alignment films of said pair of substrates are substantially parallel to each other.
- [13] A viewing angle controlling unit as claimed in claim 12, wherein said pair of polarized plates are arranged in crossed Nicols way.
- [14] A viewing angle controlling unit as claimed in claim 13, wherein an optical axis of one polarized plate is substantially perpendicular to said rubbing direction and an optical axis of an other polarized plate is in substantially parallel to said rubbing direction.
- [15] A viewing angle controlling unit as claimed in claim 12, wherein said pair of polarized plates are arranged in parallel Nicols way.
- [16] A viewing angle controlling unit as claimed in claim 15, wherein optical axes of said pair of polarized plates are in substantially parallel to said rubbing direction.
- [17] A viewing angle controlling unit as claimed in any one of claims 12 to 16, further comprising a power source for applying a voltage to said electrode and power source controlling means for controlling the switching of said power source.
- [18] A viewing angle controlling unit as claimed in any one of claims 12 to 17, wherein a retardation value of said liquid crystal layer is within the range of 200nm to 1000nm.
- [19] A viewing angle controlling unit as claimed in any one of claims 12 to 18, wherein said optical axis is an absorption axis or a transparent axis.